

1. Project title: Electrosense

2. Names and email addresses of team members (CSE members first--this is a plan for the CSE contribution)

Marko Vukasinovic: mvukasinovic2019@my.fit.edu

Katie Canedo: kcanedo2020@my.fit.edu

Alexis Haley: ahaley2019@my.fit.edu

Aveisha Maharaj: amaharaj2019@my.fit.edu

Kayla Mastin: kmastin2019@my.fit.edu

3. Faculty advisor:

4. Client: Venkat Keshav Chivukula

5. Date(s) of Meeting(s) with the Client for developing this Plan: Tuesdays and Thursdays

6. Goal and motivation: Discuss the overall goal (help make the intended users "happier") and motivation (why are the intended users not too "happy"? limitations/pains of current systems) happier"?)

The goal of our project is to create a hospital mattress designed for ICU patients that incorporates sensors within. This would help healthcare workers know when something is wrong with their patient which would help make sure the ICU patients are safe and Comfortable.

7. Approach (key features of the system): Discuss at least three key features/functionalities that your system provides for the users to help achieve the overall goal.

(what features does your system have that can help make the happier"?)

(at least one paragraph for each feature, more specific less vague) [e.g. Similar to app descriptions at Google Play, ****NOT**** the underlying tools]

For interdisciplinary/external projects: focus on (identify) separate CSE features/contributions

The main system consists of a mattress attached to various sensors connected to a central processing unit. This goes along with an IOS app to connect to the bed via Bluetooth to be able to alert nurses of rapid changes in vitals. It will also assist CNAs who are understaffed in collecting basic vitals such as heart rate and pulse oximetry as well as preventing bed sores.

The system is comprised of:

Pressure sensors for body pressure mapping which will provide things like weight distribution and sleep analysis throughout the night

Heart rate and pulse oximetry sensors to provide around the clock updates of basic vitals

Bed alarm sensor to detect when the patient is rapidly moving (which could indicate convulsion activity) or when a patient on bed rest is trying to get up

Temperature sensors that will be adjustable in 3 regions

Circulation compression pumps combined with massager to prevent bed sores and rotate bed bound patients

Each of the aforementioned sensors comes with specific data gathering libraries available which will be used in order to gather acquired data in one place. We will then use a different script to send the collected data over bluetooth, to be received over the phone app

The phone app will consist of a UI interface and data displays configured to showcase the data received from the bluetooth.

8. Novel features/functionalities:

Combination of a wide variety of sensors in order to create a broader picture for the healthcare provider of their patient than possible before.

9. Technical Challenges: Discuss three main CSE-related challenges

We plan on using SWIFT and XCode for our application without having much experience due to the fact that we plan on testing our product on the iPad.

Integrating many different sensors together will be difficult as their operating libraries are incompatible and will give results in different intervals, accuracies, etc. Grouping the collected data and cleaning it presents the biggest challenge.

The team has no experience with facilitating bluetooth communication between two devices which might require further equipment to be integrated.

10. Milestone 1 (Oct 3):

- Compare and select technical tools for Developing application, Controlling sensors and gathering their input, Bluetooth communication
- Provide small ("hello world") demo(s) to evaluate the tools for Developing application, Controlling sensors and gathering their input, Bluetooth communication
- Resolve technical challenges: Choosing and implementing a sensor, Building basic framework for the application, Decide on transfer of data issue
- Compare and select collaboration tools for software development, documents/presentations, communication, task calendar
- Create Requirement Document
- Create Design Document
- Create Test Plan and Datasets

11. Milestone 2 (Oct 31):

- Implement, test, and demo Basic App Layout and Data Display
- Implement, test, and demo Bluetooth Communication between Arduino and App

12. Milestone 3 (Nov 28):

- Implement, test, and demo Pressure Sensors
- Implement, test, and demo Heart Rate Sensors
- Implement, test, and demo Temperature Sensors
- Implement, test, and demo Bed Alarm Sensors
- Implement, test, and demo Circulation Pumps

13. Task matrix for Milestone 1 (Software side members)

Task	Kayla	Alexis	Marko
Compare and select Technical Tools	App Development	Sensor Programming	Bluetooth Communication
"Hello world" demo	Data Display	Sensor Data Programming	Bluetooth Communication
Resolve Technical Challenges	Use XCode and SWIFT for App Development	Implement a Sensor Library	Implement Bluetooth Communication and make sure gathered data is compatible with app
Compare and select Collaboration Tools	programs	documents/presentations	communication, task calendar
Requirement Document	Write 0%	Write 0%	Write 100%
Design Document	Write 0%	Write 0%	Write 100%
Test Plan	Write 0%	Write 0%	Write 100%

14. Approval from Faculty Advisor

○ "I have discussed with the team and approve this project plan. I will evaluate the progress and assign a grade for each of the three milestones."

○ Signature: _____ Date: _____